TRIGSIM++

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- Status of the code
  - Calo/Muon/XFT/XTRP/svt
- TRGSim++ offline executable
- TRGSim++ online executable – TrigMon

TRIGSIM++

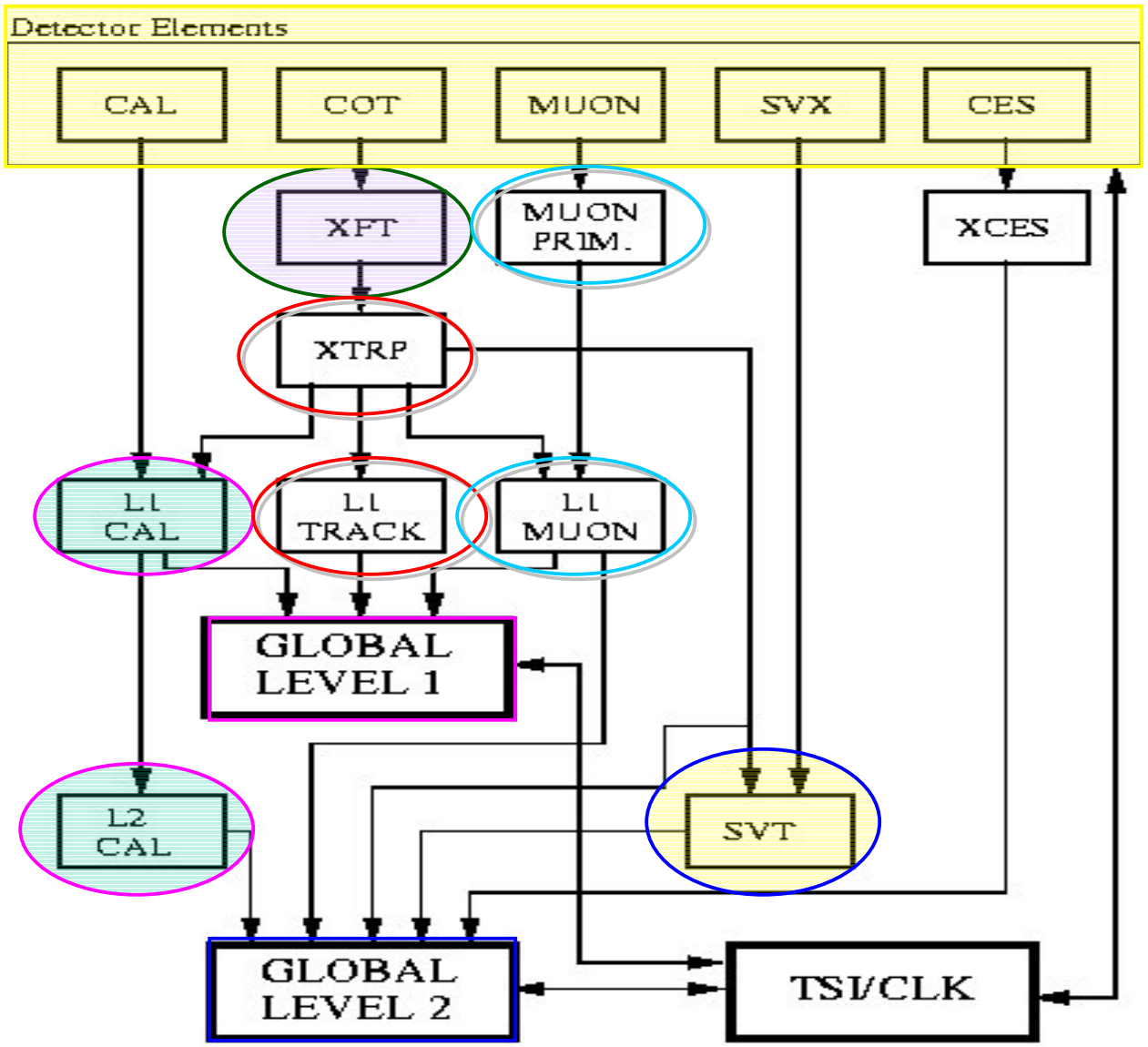
TRGSIM++ is a set of (C++) packages which simulate/emulate the various trigger levels decision steps

- offline tool to calculate rates and efficiencies;
- online monitoring tool (TrigMon or standalone).

- CalTrigger
- MuonTrigger
- XFTSim
- svtsim
- XTRPSim
- L2GlobalTrigger / L1GlobalTrigger
- TriggerMods

- Trigsim modules run off raw data D-banks and produce trigger banks as output as defined in cdfnote 4152 -
- TriggerObjects

RUN II TRIGGER SYSTEM



Status of the code

- CalTrigger : CalTriggerExe
  - package design and coding completed by end of summer 99 (S. Rolli and H. Ray- Michigan, R. Culbertson, UC). Output written to TC2D/TC1D.
  - Thoroughly checked against real data (cosmic run - P.Amaral- UC, M. Tecchio, Michigan)
  - used several times to spot cable swapping, bad ADMEM programming etc.

- XFTSim: XFTSimTest
  - Java simulation successfully translated in C++ by the OHIO State group. Output written to XFLD/XFFD

Status of the code (cont'd)

- svtsim: svtsimTest
  - simulation completed , output written to SVTD_StorableBank (B. Ashmanskas)
- MuonTrigger : MuonTriggerExe
  - MuonPrimitives for CMU/CMX/(CMP) - preliminary version (E. James, K, Bartholome, S. Rolli)

- XTRPSim XTRPSimExe
  - Java simulation successfully translated in C++ by the UIUC group (J. Halliday, N, Eddy, K. Pitts, S. Rolli). Output written to XTRD_StorableBank

Status of the code (cont'd)

- L1 Global
  - G. Field - Code just arrived, need to be integrated
- L2Global
  - S. Miller - No simulation yet
- XCES
  - K. Byrum - no code yet

Trigger Banks

- TriggerObjects is the package which contains the trigger banks classes.
  - Responsible for changes to the format and content of the banks (after consulting with online people) : D. Dagenhart (editor of CDF 4152)
  - Librarian and responsible for the package (code): S. Rolli
    - TC2D_StorableBank
    - TC1D_StorableBank
    - TFRD_StorableBank
    - SL1D_StorableBank
    - TCMD_StorableBank
    - TL2D_StorableBank
    - TL1D_StorableBank
    - XFFD_StorableBank
    - XFLD_StorableBank
    - SVTD_StorableBank
    - XTRD_StorableBank

Trigger_StorableBank

TRGSim++

- The global offline trigger simulation executable is built in the package TriggerMods: it is called TRGSim++
  - so far : XFTSim,XTRPSim,svtsim,CalTrigger,MuonTrigger
- built every night as part of development (also all the individual bins)
  - then one can run it issuing the command TRGsim++
- in TriggerMods/test/run_TRGSim++.tcl contains the talk-to up to date for the different modules

Databases access

- TRGSIM++ uses a simple API to access different databases (TriggerTableDB , RunCondition, calibration, hardaware db etc)
  - RunConfigDB package was setup by Mark Lancaster and it is now used to access RunConditionsDB for CalTrigger L1. It will be extended to access TriggerTableDB
    - a few issues should be defined:
      - example offline API doesn't know how to treat clobs so far, so files are outside the database in the offline CVS repository which is the only repository accessible to both environments.

- In almost all the TRIGSim packages there are several configurations/memory pattern files (CalTrigger, svtsim, XFTSim) which are kept in the offline CVS repository in order to be accessible online and offline and synchronized
- While database development is underway, please let's try not to break code already working (ex access to files paths).

Monitor

- When TRGSim++ runs online, it should provide :
  - quick way to spot failures and errors on an event by event basis;
  - plots and histograms of real and simulated data;

- TrigSim is a bit by bit emulation of the hardware then it is a crucial tool to check its functionality.
- It should be run as part of the Consumer job every day

- The TC1D/TC2D_monitor have been used successfully several times and contributed already to spot errors in the hardware.

Monitor (cont'd)

- As part of TRGSim++ each subsystem driver module contains bank monitors methods which check word by word real and simulated banks, firing error messages on the error logger and on the standard output if discrepancy is found:
  - TC1D/TC2D_monitor (AbsEvent* anEvent)
  - XFFD/XFLD_monitor(AbsEvent* anEvent)
  - XTRD_monitor(AbsEvent* anEvent)
  - SVTD_monitor(AbsEvent* anEvent)
  - TCMD_monitor(AbsEvent* anEvent)

  } Their use can be controlled through talk-to

- Advantage of being very quick in respect to Root histograms
- Disadvantage of big screen scrolls when there are many errors!

Monitor (cont'd)

- TRGSim++ can be run in 2 modes:
  - Root mode, with histograms (to be decided upon) for data and simulation
    - Histogram makers Consumer template - TrigMon
  - TRGSim standalone mode with fast bank monitors -
- This is easily achievable through talk-to (module disable/enable) or multiple executables

Monitor (cont'd)

- The TRGSim++ executable be built every night against development. This will avoid:
  1) using a frozen bin which is not updated with the rest of the code (some the Trigger Simulation packages are still being worked on)
  2) using a frozen bin gives many times problems with loading shared libraries (even those on which TRGSim++ doesn't depend directly) The code simply doesn't start: example, the exe was built on Aug 14 and I tried to run it on August 15:

source runTrigMon_CalTrigger.csh 1

starting TrigMon

[1] 32139

/data1/rolli/software/test6>/data1/rolli/software/test6/bin/Linux2KCC_3_3/TrigMn: error in loading shared libraries: /cdf/codeLinux2.0.34/cdfoffline/dist/releases/development/lib/Linux2KCC_3_3/libConsumeRDict.so: undefined symbol: __ct__10CHistogramFP3TH1PC7TObjectN21

With an exe built automatically every night this would be avoided.

Monitor (cont'd)

- Please, send e-mail to

  rolli@fnal.gov

- every time there is a TRGSim++ crash or core dump and the user should do the following:
- gdb exe_name core
- when inside gdb issue the command where: this gives the error stack
- cut and paste in the mail and send it to us
- There are errors that can be fixed in 30 seconds but I need to be informed or it's going to take 30 days. I'm not in the control room all the time - actually almost never ☺ .....

Plans and conclusions

- Now
  - CalTrigger, MuonTrigger, XFTSim and SVTSim, XTRPSim can be run and produce respective banks – running online
  - Need to start using TRGSim++ online (mostly CalTrigger now)

- Commissioning run (from CDF week…):
  - need to finalize database issues - done
  - needs XTRP - done (thanks UIUC!!)
  - Needs L1Global/L2 Global still to be done…..CRITICAL